

REMARKS:

REMARKS REGARDING AMENDMENTS TO THE ABSTRACT:

The abstract has been amended to reduce the word count.

REMARKS REGARDING CLAIM AMENDMENTS AND THE NEW CLAIM:

The claims have been amended responsive to Examiner's claim objections outlined at the top of page 3 of the Official Action; the noticed deficiencies have been remedied. Care has been taken to avoid narrowing the scope of the claims in those amendments.

Claim 1 has been further amended to positively claim that the induced axial force generated by the interacting tooth faces assists movement of the ring gear during a shift to the low range position, and not merely provides a tendency therefore. The same providing greater distinction from Pigozzi ('062) as discussed hereinbelow.

Claim 9 has been amended to clarify that the inter-engaging gear teeth are helical.

New claim 21 has been added in method format. It is directed toward the same invention as the balance of the claims, but because of the method format, fully exploits the unique performance features of the present invention associated with gear shift-assistance between operating configurations of the range gearbox utilizing the axial forces generated by the interacting helically configured gear teeth.

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IN RESPONSE TO THE OFFICE ACTION:**BACKGROUND AND SUMMARY OF THE INVENTION:**

A primary and important feature of the present invention is summarized in paragraph [0016] of the application as originally filed where it is explained that “[t]he teeth in the planetary gear set are angled in relation to the longitudinal axis of the input shaft and the output shaft, and are shown and known as helical teeth. During synchronizing, an axial force then arises on the ring gear. According to the invention, the angling of the teeth is in such a direction that the axial force that occurs on the ring gear augments the external shifting force. In this way, synchronizing and shifting are facilitated.” This feature is reflected in the limitations of each of Applicant’s independent claims; therefore, it is this feature that is primarily addressed herein, and which is not disclosed, taught or suggested in any of the references of record, either individually, or in any appropriate combination thereof.

REJECTION UNDER 35 U.S.C. § 103:

Examiner has variously rejected Applicant’s original claims as obvious based on a combination of Larsson (‘538) in view of Pigozzi (‘062) under 35 U.S.C. § 103. Regarding Larsson (‘538), Examiner has listed a series of common structural features between that reference and Applicant’s claimed invention, but finally concludes with her observation of the fact that “but the teeth are not angled to provide axial force to assist shifting between the first and second positions. Examiner has made certain observations about Pigozzi (‘062), but none of those observations address the missing feature Examiner identifies with respect to Larsson (‘538); namely, Examiner states that ^{Larson (‘538)} ~~Pigozzi (‘062)~~ does not disclose the development of “an axial force to assist shifting between first and second positions.”

Regarding Pigozzi (‘062), Examiner refers to several excerpts and figures, but Examiner’s conclusions are diametrically opposed to what is disclosed in Pigozzi (‘062). Figures 5 and 6 of Pigozzi (‘062), which are duplicated below, serve to illustrate these facts.

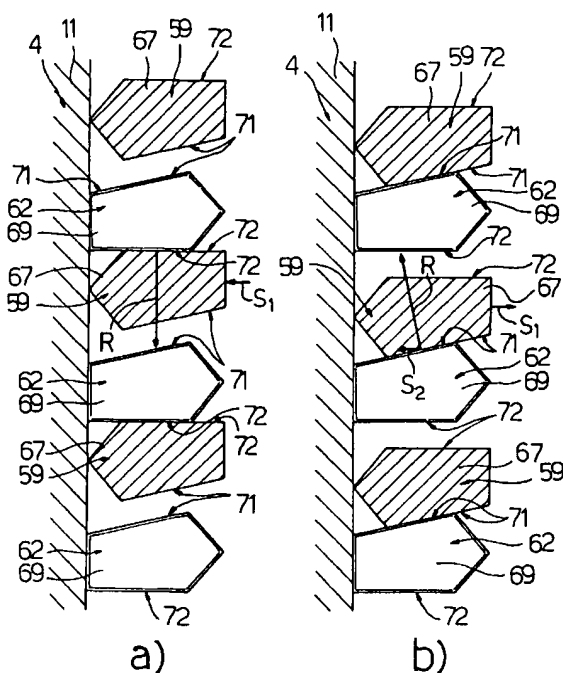


Fig. 5

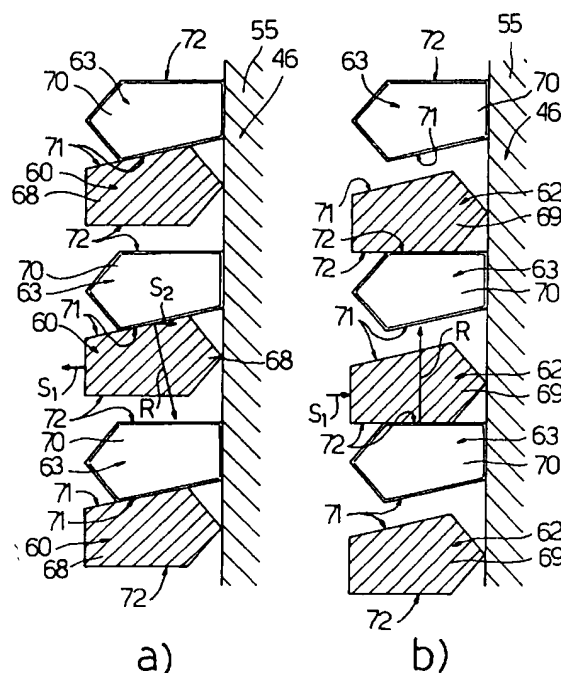


Fig. 6

Pigozzi ('062), at column 4, beginning at line 54 states: "[a]ccording to the present invention, the sun gear 22, the planet gears 43 and the inner teeth 57 of the crown 56 comprise respective helical teeth 64, 65, 66, and the toothed wheels 59, 60, 62, 63 comprise respective teeth 67, 68, 69, 70 (FIGS. 2 to 6) having a helical flank 71 inclined with respect to the axis A so as to generate on the crown 56, in operation, a restraining reaction R having an axial component S_2 adapted to oppose and to prevail over an axial thrust S_1 generated on the crown 56 as a result of the engagement of the helical teeth 64, 65, 66 of the auxiliary train 3 and tending to displace it from the operating position in which it is located."

As may be appreciated from the detailed description of columns 5-7, the helical arrangements are utilized to keep the gears in their relative orientations during first and second operating positions (as opposed to any sort of induced effect during gear changing) for the purpose of reducing operating noise. In each case, axial forces attributable to the helical teeth arrangements are (1) directed toward the wall 11 where they are discharged, and/or (2) are restrained by prevailing axial components S_2 , A_2 and R . This effect is summarized at column 2, line 23 of Pigozzi ('062) where it is explained that "the sun gear, the planet gears and the inner teeth of the crown comprise respective helical teeth and in that the first, second, third and fourth toothed wheels comprise respective teeth having at least one helical flank inclined with respect to the longitudinal axis in order to generate on the crown, during operation, a restraining reaction having an axial component adapted at least to balance an axial thrust generated on this crown as a result of the engagement of the helical teeth of the auxiliary epicyclic gear train and tending to displace it from the operating position in which it is located."

There is no teaching, disclosure nor suggestion of Applicant's claimed invention (method and arrangement) in which gear shift-assisting axial forces are induced which facilitate gear shifts between the different configurations of the range gearbox in Pigozzi ('062), or in Pigozzi ('062) combination with Larsson ('538).



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Applicant: ALFREDSSON, Sverker

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GENERAL REMARKS:

Care has been taken to avoid adding new matter to the application, as well as claim the same invention; albeit, in various ways via the several independent claims.

The undersigned representative requests any extension of time that may be deemed necessary to further the prosecution of this application.

Further, the undersigned representative authorizes the Commissioner to charge any additional fees under 37 C.F.R. 1.16 or 1.17 that may be required, or credit any overpayment, to Deposit Account No. 08-3038, referencing Order No. 07589.0060.PCUS00.

In order to facilitate the resolution of any issues or questions presented by this paper, Examiner is requested to directly contact the undersigned by phone to further the discussion.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Tracy W. Druce'. The signature is fluid and cursive, with the first name 'Tracy' being more prominent.

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